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EXAMINER	
ELLIS, SUEZU Y	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/669,009	TAKEYAMA ET AL.	
	Examiner	Art Unit	
	Suezu Ellis	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *4 and 24* is/are allowed.

6)☒ Claim(s) *1-3,5-15,18,19,22,23 and 25-28* is/are rejected.

7)☒ Claim(s) *16,17,20 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948).
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

RESPONSE TO AMENDMENT

Response to Arguments

The indicated allowability of claims 1-3, 5-15, 18, 19, 22, 23 and 25-28 is withdrawn in view of the newly discovered references to JP 2001-180043 (Maeda), Ozaki et al. (US 6,243,124), and Fujii et al. (US 5,424,765). Rejections based on the newly cited references follow.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 14 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese patent JP 2001-180043 (Maeda). See pre-grant publication 2001/0028387 for translation purposes.

With respect to claims 14 and 26, Maeda discloses an image forming apparatus comprising a write clock generating circuit which counts the number of clocks based on the detected signals from detecting sensors. Maeda further discloses the clock frequency is compared to a reference count number and is corrected, or adjusted, so that the number of clocks coincides with the reference

count number. Maeda further discloses the clock frequency controls the lighting control of the laser diode and as the number of clock frequency increases, the image density, or a condition of image forming process, also increases ([0005] – [0008]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 5-8, 11-13, 22 and 25 are rejected under 35 U.S.C. 103(a) as being obvious over Maeda.

With respect to claim 1, 2, 12, 13, 22 and 25 are Maeda illustrates in Figs. 11 and 27, an image forming apparatus comprising a plurality of optical systems (image formation units) and optical carriers (laser beam scanning units), wherein each system scans a surface of the image carrier with a laser beam to form a multi-color image by superimposing each of four colors, wherein each image formation section has one color (e.g. yellow, magenta, cyan and black) ([0105]). Maeda further discloses a plurality of first detectors that are disposed at a first position along the main scanning direction of the laser. Although Maeda fails to expressly disclose in Fig. 27, a plurality of second detecting units disposed at a

second position along the main scanning direction of the laser, Maeda does disclose in Fig. 2, it is well known for a single system to have both first and second detecting units disposed at a first and a second position along the main scanning direction of the laser. Thus, it would be an obvious design choice that both optical systems in Fig. 27 would have a first and second detecting unit as well, in order to detect the start and end of the scanning direction. In reference to Fig. 2, Maeda discloses when the laser scans both of the sensors (201 and 202), the sensors may output synchronization detection signals DETP 1 and DETP 2, respectively. Maeda discloses the clock frequency is adjusted via magnification correction section ([0085]). Maeda further discloses a time difference counting section measures the time difference between the generation time periods of DETP 1 and DETP 2, where section includes a counter that will be reset by the DETP 1 and start counting write clocks that are generated via a write clock generator ([0085], [0089]). Maeda further discloses the inclusion of a reference clock generator (208) to create reference counts. Fig. 9 illustrates the adjustment of the write clock frequency so as to coincide with the reference value. Maeda further discloses it is well known in prior art that the write clock frequency generally controls lighting control of a laser diode and increases image density when the number of frequency is increased ([0008]). The image density is deemed to be a condition of image forming process that occurs after the clock frequency is adjusted. It would have been obvious to a person of ordinary skill in the art to change the image density in order to produce a higher quality image.

With respect to claim 5, the modified Maeda discloses that when selecting a reference value (prescribed amount), the clock frequency adjusting unit selects a time difference substantially equal to a reference time difference thus the adjustment can be substantially precise, thus the amount of adjustment is a minimum ([0091]).

With respect to claim 6, the modified Maeda fails to expressly disclose the second detecting unit being a linear charge-coupled device (CCD), however it is well known in the art to use a linear CCD as a sensor. It would have been an obvious design choice to modify the second detecting unit to be a linear CCD since CCDs are readily available.

With respect to claim 7, the modified Maeda discloses the adjustment of the write clock frequency (magnification correction) occurs when image formation begins ([0185]).

With respect to claim 8, the modified Maeda discloses a temperature detector that detects and ambient temperature (initial temperature of the fθ lens) and a determining unit that detects whether a change in predetermined time ([0026], line 7; [0029]; [0135]). The modified Maeda further discloses the clock frequency adjusting unit (magnification correction section) adjusts the write clock frequency based upon the temperature. Since the adjustment is made in accordance with the temperature, there must be a determining unit/comparison means to determine the difference in the temperatures.

With respect to claim 11, the modified Maeda further discloses in Fig. 11 an intermediate transfer body (B), a plurality of image forming units opposite to

the moving surface of the intermediate transfer body, where each image forming unit includes an image carrier (109), a writing unit (Fig. 16), and a plurality of developing units (108).

Claim 9 is rejected under 35 U.S.C. 103(a) as being obvious over Maeda in view of Neary (US 6,151,152).

With respect to claim 9, the modified Maeda addresses all the limitations of claim 1. The modified Maeda fails to disclose the period (time difference) measured from the first detecting unit to the second detecting unit until the units detect the laser, is averaged. Maeda and Neary are directed to a similar field of endeavor of scanning systems. Neary discloses it is well known to calculate and average time value for the time difference (col. 3, lines 46-58). It would have been obvious to a person of ordinary skill in the art to calculate an average time value in order to correct the reference frequency error to adjust the reference frequency.

Claims 3, 18, 23 and 27 are rejected under 35 U.S.C. 103(a) as being obvious over Maeda in view of Ozaki et al. (US 6,243,124). Hereinafter, Ozaki et al. will be referred to as Ozaki.

With respect to claims 3, 18, 23 and 27, Maeda illustrates in Figs. 11 and 27, an image forming apparatus comprising a plurality of optical systems (image formation units) and optical carriers (laser beam scanning units), wherein each system scans a surface of the image carrier with a laser beam to form a multi-

color image by superimposing each of four colors, wherein each image formation section has one color (e.g. yellow, magenta, cyan and black) ([0105]). Maeda further discloses a plurality of first detectors that are disposed at a first position along the main scanning direction of the laser. Although Maeda fails to expressly disclose in Fig. 27, a plurality of second and third detecting units disposed at a second and third position along the main scanning direction of the laser, Maeda does disclose in Fig. 2, it is well known for a single system to have both first and second detecting units disposed at a first and a second position along the main scanning direction of the laser. Thus, it would be an obvious design choice that both optical systems in Fig. 27 would have a first and second detecting unit as well, in order to detect the start and end of the scanning direction. In reference to Fig. 2, Maeda discloses when the laser scans both of the sensors (201 and 202), the sensors may output synchronization detection signals DETP 1 and DETP 2, respectively. Maeda discloses the clock frequency is adjusted via a magnification correction section based upon the detection signals ([0085]). Maeda further discloses a time difference counting section measures the time difference between the generation time periods of DETP 1 and DETP 2, where section includes a counter that will be reset by the DETP 1 and start counting write clocks that are generated via a write clock generator ([0085], [0089]). Maeda further discloses the inclusion of a reference clock generator (208) to create reference counts. Fig. 9 illustrates the adjustment of the write clock frequency so as to coincide with the reference value. Maeda and Ozaki are directed towards a similar field of endeavor of image forming apparatuses. Ozaki

discloses in Fig. 5, an optical system which comprises three CCD sensors in three different positions along the main scanning direction. It would have been an obvious design choice to a person of ordinary skill in the art to modify Maeda to include a plurality of third detection units in a third position in order to more accurately detect the position of the laser during scanning. Ozaki discloses a clock pulse generator for generating a clock pulse for clocking and a count circuit to counting the clock pulses, wherein the scanning period is determined by the number of clock pulses outputted from the generator (col. 26, lines 1-3, 46-48). Ozaki fails to expressly disclose the third detecting unit counting the number of clocks as a reference value and adjusting the write clock frequency to coincide with the reference value. However, it would have been an obvious design choice to a person of ordinary skill in the art to incorporate the counting the number of clocks as a reference value and adjusting the write clock frequency to coincide with the reference value as another way to determine the position of the laser beam.

Claims 15, 19 and 28 are rejected under 35 U.S.C. 103(a) as being obvious over Maeda in view of Fujii et al. (US 5,424,765). Hereinafter, Fujii et al. will be referred to as Fujii.

With respect to claims 15, Maeda addresses all the limitations of claim 14, however fails to expressly disclose the image forming apparatus including a phase-locked loop with variable filters. Maeda and Fujii are directed to a similar field of endeavor of scanning apparatuses. Fujii discloses using a phase-locked

loop, which includes a phase comparator and a low-pass filter, for generating a reference signal in a scanning device (col. 3, lines 34-36). Fujii fails to expressly disclose the phase-locked loop having variable filters, however, it would have been an obvious design choice to a person of ordinary skill in the art to include a phase-locked loop with variable filters to the system of Maeda in order to fine-tune the adjustment of the clock frequency.

With respect to claims 19 and 28, Maeda discloses an image forming apparatus comprising a plurality of optical systems (image formation units) and optical carriers (laser beam scanning units), wherein each system scans a surface of the image carrier with a laser beam to form a multi-color image by superimposing each of four colors, wherein each image formation section has one color (e.g. yellow, magenta, cyan and black) ([0105]). Maeda further discloses a plurality of first detectors that are disposed at a first position along the main scanning direction of the laser. Although Maeda fails to expressly disclose in Fig. 27, a plurality of second and third detecting units disposed at a second and third position along the main scanning direction of the laser, Maeda does disclose in Fig. 2, it is well known for a single system to have both first and second detecting units disposed at a first and a second position along the main scanning direction of the laser. Thus, it would be an obvious design choice that both optical systems in Fig. 27 would have a first and second detecting unit as well, in order to detect the start and end of the scanning direction. Maeda further teaches it is well known in the art for adjusting the number of clocks of a write clock frequency dependent on signals from the detecting units ([007], [0008]).

Maeda fails to expressly disclose the clock frequency adjusting unit including a phase-locked loop with variable filters. Fujii discloses using a phase-locked loop, which includes a phase comparator and a low-pass filter, for generating a reference signal in a scanning device (col. 3, lines 34-36). Fujii fails to expressly disclose the phase-locked loop having variable filters, however, it would have been an obvious design choice to a person of ordinary skill in the art to include a phase-locked loop with variable filters to the clock frequency adjusting unit of Maeda in order to fine-tune the adjustment of the clock frequency.

Allowable Subject Matter

Claim 4 and 24 are allowed.

With respect to claims 4 and 24, prior art fails to teach or reasonably suggest, the clock frequency adjusting unit comprising a phase-locked loop with variable filters that multiplies a reference clock by a multiple N and varies the number of filters in the phase-locked loop and the multiple N to adjust the write clock frequency.

Claims 16, 17, 20 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claims 16 and 20, prior art fails to teach or reasonably suggest the phase-locked loop multiplies a reference clock by a multiple N.

With respect to claims 17 and 21, prior art fails to teach the clock frequency adjusting unit varies the number of filters in the phase-locked loop and the multiple N to adjust the write clock frequency.

Telephone/Fax Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suezu Ellis whose telephone number is (571) 272-2868. The examiner can normally be reached on 8:30am-5pm (Monday-Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stephone B. Allen
Primary Examiner